

## **Muttongrass Advanced Evaluation Planting**

**Study Number: IDPMC-P-0602-RA**

**Derek J. Tilley**

Natural Resources Conservation Service

Plant Materials Center

Aberdeen, Idaho

Progress Report October 1, 2006: Establishment Year

### **Introduction**

Muttongrass (or mutton bluegrass), (*Poa fendleriana* Steud. [Vasey]) is an important late successional understory component in juniper and piñon-juniper communities. It is a perennial bunchgrass growing 0.7 to 2.5 feet tall with narrow leaves (1 to 3mm wide). The species is generally considered apomictic (not requiring fertilization for seed production). The flowers are typically pistillate (only female), but occasional staminate (male) flowers arise giving the species the ability to hybridize with other bluegrasses (Welsh and others 2003). The species is highly drought tolerant and has potential for use in restoration and native diversification projects throughout the West. Its natural range covers southern Canada to Texas and east to the Dakotas. At present there are no industry releases.

In June 1995, Loren St. John (Team Leader, Idaho PMC) and Paul Sladish (NRCS Field Office, Caliente, NV) collected accession 9076402 of “*Poa* sp.” in Lincoln County, NV to be included in an initial evaluation trial of the Sandberg bluegrass (*Poa secunda* Presl) complex. In 1999, accession 9076402 was positively identified by Idaho State University Herbarium Curator, Jim Glennon, as muttongrass. Due to its high level of performance noted in the Sandberg bluegrass trial, a 0.10 acre initial seed increase field of 9076402 was planted in 2002 at the PMC home farm to produce seed for future evaluation.

This advanced evaluation trial was established to compare accession 9076402 with other muttongrass collections from the Intermountain West for the following characteristics: 1) establishment, 2) seedling vigor, 3) forage production, 4) seed production, 5) plant and stand longevity, and 6) ease of seed harvest, with the prospect of a future selected class release. The trial includes six accessions, one from the Utah Crop Improvement Association (U1-03), one accession from the Upper Colorado Environmental Plant Center (9024881), three accessions from the Utah Division of Wildlife Resources (U1-05, U2-05 and U3-05), and accession 9076402 from the Aberdeen PMC.

### **Materials and Methods**

On May 5, 2006 the trial was seeded at the PMC Fish and Game Farm 3 miles north of Aberdeen, ID. The trial was planted at the north end of the existing Caribou-Targhee Native Grass Trial in Field 30. Experimental design was a randomized complete block with 4 replications of 20 foot rows. Each plot consisted of 1 row with 3' spacing. Border rows of Tegmar intermediate wheatgrass (*Thinopyrum intermedium* [Host] Barkworth & D. Dewey) were included to reduce edge effect. The target seeding rate was 50 pure live seeds (PLS) per foot of row based on recommended seeding rates from Ogle and others (2006). Seed weight was approximated at 890,000 seeds per pound (Monsen and others 2004). Viability was determined using the “popper method” (Ogle and Cornforth 2000). Seed packets were weighed out for each plot, and mixed with approximately 2.0g (1 tablespoon) of rice hulls for improved flow through the seeder. Seed was planted with a hand pushed belt seeder to a depth of 0.25 inches. Table 1

provides seed and planting information. Plots were irrigated as needed for establishment and weeds were controlled with between-row mechanical cultivation and a late season spray application of 2, 4-D.

Table 1. Seed and planting information

Accession or #	Source and contact	% viability	% purity	% PLS	lb/bu	Bulk/rep (g)
9076402	IDPMC	87	98.0	85.26	13.6	0.60
U1-03	UCIA-S. Kitchen	68	90*	61.2	15.3	0.83
9024881	UCEPC-S. Parr	67	91	61.6	13.6	0.83
U2-05	UTDWR-J.Vernon	56	90*	50.4	10.5	1.01
U3-05	UTDWR-J.Vernon	54	90*	48.6	12.3	1.05
U1-05	UTDWR-J.Vernon	62	73.6	45.6	13.1	1.19

\* estimated 90% purity on collections w/o data

The plots were evaluated on June 12, 2006 for percent stand, plant density and seedling vigor. Plots were evaluated again on September 26, 2006 for percent stand, plant density, and seedling vigor as well as plant height. Percent stand was determined by stretching a 20' rope marked with one foot increments over the row. Increments intersecting a plant were counted and divided by 19 (the number of increments) to produce a percentage. For plant density, plants were counted in the center-most two feet of row in the plot and divided by 2 to provide plants per foot of row. Seedling vigor was measured on a subjective scale of one to nine (one being most healthy and nine being dead). Each plot was assessed and given a rating based on overall apparent vigor. For plant height, the plant closest to intersecting the five foot increment was measured at its tallest point in millimeters.

All data were analyzed using Statistix 8 Analytical Software. All data met the assumptions for the Analysis of Variance (unless otherwise specified) using Bartlett's test for equal variances, the Shapiro-Wilk normality test, and Tukey's test for non-additivity.

## 2006 Evaluations

No significant differences for percent stand, plant density or height were detected ( $P < 0.05$ ) for either evaluation date (table 2). Vigor data did not meet all of the assumptions for the ANOVA; therefore means were not separated statistically. All plants looked healthy and were growing well despite pressure from annual weeds such as cutleaf nightshade (*Solanum triflorum* Nuttall) and prostrate pigweed (*Amaranthus blitoides* S. Watson).

Table 2. 2006 Muttongrass evaluations (establishment year)

Accession or PI #	-----6/12/06-----			-----9/26/06-----			
	% stand	Density (pl/ft)	Vigor	% stand	Density (pl/ft)	Vigor	Height (mm)
9076402	53 <sup>a</sup>	20 <sup>a</sup>	1.00 <sup>b</sup>	54 <sup>a</sup>	7 <sup>a</sup>	2.00 <sup>b</sup>	85 <sup>a</sup>
U1-03	58	13	1.00	46	5	2.00	74
9024881	64	20	1.00	53	5	2.50	69
U2-05	64	22	1.25	62	7	1.75	81
U3-05	67	25	1.00	59	8	2.00	76
U1-05	53	15	2.00	53	4	2.753	56

<sup>a</sup> No significant differences detected ( $P < 0.05$ ).

<sup>b</sup> Assumptions for ANOVA not met. No ANOVA performed.

Because this evaluation covers only the establishment year, it is too early to determine the feasibility of a release of any of the test accessions. In the spring of 2007 this study will be evaluated for percent stand, plant density and vigor to determine the winter-hardiness of the accessions and will also be evaluated for biomass (forage) and seed production. Forage and seed production data will continue to be collected in 2008, 2009 and possibly beyond to evaluate stand longevity and seed production sustainability.

### **References**

Monsen, S.B., Stevens, R. and N. Shaw. 2004. Grasses. In: S.B. Monsen, R. Stevens, and N.L. Shaw [compilers]. Restoring western ranges and wildlands. Fort Collins, CO: USDA Forest Service, Rocky Mountain Research Station. General Technical Report RMRS-GTR-136-vol-2. p. 295-424.

Ogle, D.G., and B. Cornforth. 2000. Technical Note 35: A Quick Method to Estimate Germination Percentages for Seed Species. USDA-NRCS, Boise, ID. ID-TN35, Mar. 2000. 3p.

Ogle, D.G., L. St. John, M. Stannard and L. Holzworth. 2006. Technical Note 24: Grass, grass-like, forb, legume, and woody species for the intermountain west. USDA-NRCS, Boise, ID. ID-TN 24. 42p.

Welsh, S. L., N. D. Atwood, S. Goodrich and L. C. Higgins. 2003. *A Utah Flora*. Brigham Young University Press, Provo, Utah.

